Fact Sheet

US Army Corps of Engineers
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Transformation-Scale Waves

Purpose: To enhance the accuracy, range of applicability, and efficiency of the Corps' work-horse wave transformation technology, STWAVE.

Background: Near the coast, waves transform due to complex interactions with the bottom. Refraction, shoaling, local wave growth, wave-current interaction, and breaking modify the critical design parameters of wave height, period, and direction. Longshore and cross-shore variations in wave parameters are required for design and maintenance of beach, inlet, harbor, and channel projects. Nearshore waves provide the primary driving force for sediment transport, which is sensitive to breaking wave angles and energy dissipation. Accurate and efficient tools are required to estimate nearshore waves.

Facts: This project is developing improvements to the numerical wave transformation model STWAVE, which is applied in approximately 50 Corps projects a year. Efforts have been made to improve the model efficiency by approximately 50 percent, allowing larger spatial coverage and higher resolution solutions. An advanced grid nesting technique has been developed for more efficient simulations. Formulations for wave-current interaction and wave breaking have been developed. Also, the model has been made more accessible through development of a web page (http://chl.wes.army.mil/research/wave/wavesprg/numeric/wtransformation/stwave.htp), support software, and documentation. Yearly workshops have been given to transfer the technology to field users. Present efforts focus on development of a full-plane version of the model that allows propagation of waves in all directions for applications to bays, lakes, and reservoirs.

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